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REMARKS

By this amendment and response, claims 38-49 have been cancelled. Claims 50, 55, 56 and 51 have been amended. Accordingly, claims 50-61 remain pending in this application.

With respect to the Office's request on Page 2 of the outstanding Office that the undersigned representative "identify[ing] why the cited reference is pertinent to the claimed optical recording media including relevant portions of the document cited," the undersigned representative submits that each of the references was cited in order to ensure that the undersigned representative's duty under 37 C.F.R. §1.56, as well as the duty attributable to other individuals associated with the filing and prosecution of the present application, has been met. More particularly, the undersigned representative notes that many of the references were cited in other applications and patents to which the current application claims priority and/or which having overlapping co-inventors, e.g., Richard Sutherland, Lalgudi Natarajan, etc., that discuss similar subject matter, i.e., polymer-dispersed liquid crystal (PDLC) materials, electrically switchable holograms, and the like.¹ By way of example:

(1) the Examiner reviewing United States Patent Application Serial No. 09/033,512 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited Patent Nos. 5,198,912, 5,182,180 and 5,096,282 and Ingwall, et al., "Hologram-Liquid Crystal Composites," *SPIE*, Vol. 1555, Computer and Optically Generated Holographic Optics, 1991 (emphasis added);

(2) the Examiner reviewing United States Patent Application Serial No. 09/033,513 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited 5,698,343, 5,661,533, 5,198,912, 4,938,568, 4,942,102, 3,658,526, Sutherland, Richard L., et al., "Electrically Switchable Volume Gratings in Polymer-Dispersed Liquid Crystals," *Appl. Phys. Lett.*, Vol. 64(9), pp. 1074-1076,

¹ See MPEP § 2001.06(b) Information Relating to or From Copending United States Patent Applications.

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February, 1994 and Sutherland, Richard L., et al., "Bragg Gratings in an Acrylate Polymer Consisting of Periodic Polymer-Dispersed Liquid Crystal Planes," *Chem. Mater.*, Vol. 5, pp. 1533-1538, 1993 (emphasis added);

(3) the Examiner reviewing United States Patent Application Serial No. 09/033,514 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited Patent Nos. 5,198,912, 5,182,180 and 5,096,282 and Ingwall, et al., "Hologram-Liquid Crystal Composites," *SPIE*, Vol. 1555, Computer and Optically Generated Holographic Optics, 1991 (emphasis added);

(4) the Examiner reviewing United States Patent Application Serial No. 09/034,014 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited Patent Nos. 5,725,970, 5,698,343, 5,698,134, 5,695,682, 5,641,426, 5,593,615, 5,356,557, 5,323,251 and WO 89/06264 (emphasis added);

(5) the Examiner reviewing United States Patent Application Serial No. 09/429,645 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited Patent Nos. 5,698,343 and 5,166,813 (emphasis added);

(6) the Examiner reviewing United States Patent Application Serial No. 09/347,624 entitled "Switchable Volume Hologram Materials and Devices" from inventors Sutherland et al., cited Patent Nos. 5,942,157 (emphasis added);

(7) the Examiner reviewing United States Patent Application Serial No. 09/363,169 entitled "Electrically Switchable Polymer Dispersed Liquid Crystal Materials including Optical Couplers and Reconfigurable Optical Interconnects" from inventors Sutherland et al., cited Patent Nos. 5,942,157 and 5,299,289 (emphasis added); and

(8) the Examiner reviewing United States Patent Application Serial No. 09/742,397 entitled "Switchable Polymer Dispersed Liquid Crystal Optical Components" from inventors Sutherland et al., cited Patent Nos. 5,680,233, 5,942,157, 6,115,152, WO 98/04650, JP60189729, Sutherland, Richard L., et al., "Electrically Switchable Volume Gratings in Polymer-Dispersed Liquid Crystals," *Appl. Phys. Lett.*, Vol. 64(9), pp. 1074-1076, February, 1994 and Sutherland, Richard L., et al., "Bragg Gratings in an Acrylate Polymer Consisting of Periodic Polymer-Dispersed Liquid Crystal Planes," *Chem. Mater.*, Vol. 5, pp. 1533-1538, 1993, and Tondiglia et al., *Optics Letters*, Vol. 20, No. 11 (1995). (emphasis added).

Additionally, various references cited in the submitted IDSs were also submitted/cited in the following applications wherein Dr. Sutherland is a listed inventor:

(9) United States Patent Application Serial No. 10/235,633 listing Sutherland et al. as inventors entitled "Electrically Switchable Polymer Dispersed Liquid Crystal

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Materials including Optical Couplers and Reconfigurable Optical Interconnects”
(emphasis added);

(10) United States Patent Application Serial No. 10/303,927 listing Sutherland et al. as inventors entitled “Tailoring Material Composition for Optimization of Application-Specific Switchable Holograms” (emphasis added); and

(11) United States Patent Application Serial No. 10/408,259 listing Sutherland et al. as inventors entitled “Tailoring Fabrication Systems and Processes for Optimization of Application-Specific Switchable Holograms” (emphasis added).

Though the undersigned representative does not believe that any of the references cited in the submitted Information Disclosure Statements are material under the standard set forth in 37 C.F.R. §1.56(b), the undersigned representative recognizes that a reasonable Examiner may find one or more of the references to be material under said standard and thus submitted such references in accordance with 37 C.F.R. §1.56.²

Pursuant to 37 C.F.R. §1.97(h), the undersigned representative further understands that the submission of the referenced Information Disclosure Statements "shall not be construed to be an admission that the information cited in the statement is, or is considered to be, material to patentability as defined in §1.56(b)."

With respect to the specific references questioned by the Office, i.e., US 4,018,228, US 4930674, US 4929240, US 4368736 and US 4210132, the undersigned representative agrees with the Office's assessment that these references do not appear to be material to the claims of the current application. These references were cited on the face of United States Patent No. 5,942,157 to Sutherland et al. from which the current

² See also, MPEP § 2004 (10). When in doubt, it is desirable and safest to submit information. Even though the attorney, agent, or applicant doesn't consider it necessarily material, someone else may see it differently and embarrassing questions can be avoided. The court in *U.S. Industries v. Norton Co.*, 210 USPQ 94, 107 (N.D. N.Y. 1980) stated "In short, the question of relevancy in close cases, should be left to the examiner and not the applicant." See also *LaBounty Mfg., Inc. v. U.S. Int'l Trade Comm'n*, 958 F.2d 1066, 22 USPQ2d 1025 (Fed. Cir. 1992)).

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application is a direct continuation. Accordingly, the references cited during the prosecution of Patent No. 5,942,157 have been cited in an IDS in the present application.

The claims have been rejected as follows: Claims 50-61 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for hologram formation, does not reasonably provide enablement for modulation of the hologram without electrodes or switching means; Claims 43, 44, 49, 55, 56 and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention; Claims 38, 39, 41, 42, 45-48, 50, 51, 53, 54 and 57-60 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sutherland et al. '343; Claims 40-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. '343; Claims 38-61 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Dornash et al. SPIE 2689, alone or in view of Sutherland 1993 and/or Tanaka et al. '452; Claims 38, 39, 41, 42, 45-48, 50, 51, 53 and 54 and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland 1994 and Tanaka et al. '452; Claims 38, 39, 41, 42, 45-48, 50, 51, 53 and 54 and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. and Tanaka et al. '452; claims 38-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. and Tanaka et al. '452; Claims 38-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. and Tanaka et al. '452; and Claims 38-61 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of U.S. Patent No. 5,942,157.

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Rejection of Claims 50-61 are rejected under 35 U.S.C. 112, first paragraph

Per the Office's request, independent claim 50 has been amended as suggested to overcome this rejection. Accordingly, the undersigned respectfully submits that this rejection has been overcome.

Rejection of Claims 43, 44, 49, 55, 56 and 61 are rejected under 35 U.S.C.
112, 2nd paragraph

Per the Office's request, claims 55, 56 and 61 have been amended as suggested to overcome this rejection. Accordingly, the undersigned respectfully submits that this rejection has been overcome.

Rejection of Claims 38, 39, 41, 42, 45-48, 50, 51, 53, 54 and 57-60 under 35 U.S.C.
102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious
over Sutherland et al. '343

Claims 38-49 have been cancelled. Independent claim 50 (as amended) is set forth below:

50. (Currently Amended) A slanted reflection hologram made by producing an interference pattern inside a polymer-dispersed liquid crystal material, the polymer-dispersed liquid crystal material comprising, before exposure:

- (a) a polymerizable monomer;
- (b) a liquid crystal;
- (c) a cross-linking monomer;
- (d) a coinitiator; and
- (e) a photoinitiator dye;

wherein the hologram has first and second plates and a plurality of alternating planes of polymer channels having a first refractive index and planes of polymer-dispersed liquid crystal channels having a second refractive index forming a grating therebetween having a front surface and a grating vector, wherein a direction of the grating vector is not perpendicular to the front surface of the grating and further wherein in a first state where no electric field is applied to the grating via a switching

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means, a symmetry axis of the liquid crystal is oriented along the grating vector and in a second state where an electric field is applied to the grating via a switching means, the symmetry axis of the liquid crystal is perpendicular to the front surface of the grating.

A review of Sutherland '343, reveals no mention and certainly no description of reflection holograms, slanted or unslanted. As one skilled in the art can appreciate, the differences between transmission and reflection holograms can be significant, especially in the current case wherein diffraction efficiency and switchability are at issue. Accordingly, the undersigned submits that Sutherland '343 does not anticipate or render obvious the combination of limitations set forth in claims 50, 51, 53, 54 and 57-60.

Rejection of Claims 40-61 under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. '343

Per the response above, claims 40-49 have been cancelled and since Sutherland '343 does not mention or discuss reflection holograms and the Office does not offer a secondary reference describing reflection holograms and the claimed limitations, the undersigned respectfully submits that Sutherland '343 does not render obvious the combination of limitations set forth in claims 50-61.

Rejection of Claims 38-61 under 35 U.S.C. 102(a) as being fully anticipated by Domash et al. SPIE 2689, alone or in view of Sutherland 1993 and/or Tanaka et al. '452

Claims 38-49 have been cancelled. A review of Domash reveals no mention, and certainly no description of reflection holograms, slanted or unslanted. Accordingly, Domash does not fully anticipate any of claims 50-61. Similarly, Sutherland 1993 fails to teach or suggest reflection holograms, slanted or unslanted. Finally, Tanaka '452, though

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describing reflection holograms generally, does not describe slanted reflection holograms having the claimed vector attributes in response to switching means or the composition thereof as claimed. It is well established that in order to assert and maintain a *prima facie* case of unpatentability, the combination of references, in addition to other requirements, must teach each limitation of the claim. See MPEP § 2142. In this case, there is no reference cited that teaches or suggests, a reflection hologram having a grating vector wherein

the grating vector is not perpendicular to the front surface of the grating and further wherein in a first state where no electric field is applied to the grating via a switching means, a symmetry axis of the liquid crystal is oriented along the grating vector and in a second state where an electric field is applied to the grating via a switching means, the symmetry axis of the liquid crystal is perpendicular to the front surface of the grating.

Accordingly, a *prima facie* case of unpatentability cannot be maintained utilizing the combination of references. The undersigned respectfully submits that the combination of Domash, Sutherland 1993 and Tanaka does not render obvious the combination of limitations set forth in claims 50-61.

Rejection of Claims 38, 39, 41, 42, 45-48, 50, 51, 53 and 54 and 57-60 under 35 U.S.C. 103(a) as being unpatentable over Sutherland 1993 and Tanaka et al. '452

Claims 38, 39, 41, 42, 45-48 have been cancelled. The combination of Sutherland 1993 and Tanaka has been addressed above. The undersigned respectfully submits that this combination does not render obvious the combination of limitations set forth in claims 50, 51, 53 and 54 and 57-60.

Rejection of Claims 38, 39, 41, 42, 45-48, 50, 51, 53 and 54 and 57-60 under 35 U.S.C. 103(a) as being unpatentable over Sutherland 1994 and Tanaka et al. '452

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Claims 38, 39, 41, 42, 45-48 have been cancelled. Tanaka has been addressed above and fails to teach or suggest at least those limitations of the claims directed to slanted reflection holograms having the claimed vector attributes in response to switching means or the composition thereof. Similarly, Sutherland 1994 simply does not teach or suggest reflection holograms, slanted or unslanted. Accordingly, a *prima facie* case of unpatentability cannot be maintained utilizing the combination of references. The undersigned respectfully submits that the combination of Sutherland 1994 and Tanaka does not render obvious the combination of limitations set forth in claims 50, 51, 53 and 54 and 57-60.

Rejection of Claims 38-61 U.S.C. 103(a) as being unpatentable over Sutherland 2152 and Tanaka et al. '452

Claims 38-49 have been cancelled. Tanaka has been addressed above and fails to teach or suggest at least those limitations of the claims directed to slanted reflection holograms having the claimed vector attributes in response to switching means or the composition thereof. Similarly, Sutherland 2152 simply does not teach or suggest reflection holograms, slanted or unslanted. Accordingly, a *prima facie* case of unpatentability cannot be maintained utilizing the combination of references. The undersigned respectfully submits that the combination of Sutherland 2152 and Tanaka does not render obvious the combination of limitations set forth in claims 50-61.

Rejection of Claims 38-61 U.S.C. 103(a) as being unpatentable over Sutherland 2152 and Tanaka et al. '452

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Claims 38-49 have been cancelled. Tanaka has been addressed above and fails to teach or suggest at least those limitations of the claims directed to slanted reflection holograms having the claimed vector attributes in response to switching means or the composition thereof. Similarly, Sutherland 2404 simply does not teach or suggest reflection holograms, slanted or unslanted. Accordingly, a *prima facie* case of unpatentability cannot be maintained utilizing the combination of references. The undersigned respectfully submits that the combination of Sutherland 2404 and Tanaka does not render obvious the combination of limitations set forth in claims 50-61.

Rejection of Claims 38-61 U.S.C. 103(a) over Claims 1-28 of US Patent No. 5,942,157

A rejection under the judicially created doctrine of obviousness-type double patenting requires that the Office perform a 103 analysis, wherein a *prima facie* case of unpatentability must be established. Unlike a standard 103 rejection, the underlying patent is not considered to be prior art. See MPEP § 804(B)(1). More particularly, "when considering whether the invention defined in a claim of an application is an obvious variation of the invention defined in the claim of a patent, the disclosure of the patent may not be used as prior art." Id. (emphasis added). Accordingly, in this case, it is ONLY the claims of Patent No. 5,942,157 ('157 Patent) that may form the basis of the rejection, NOT the specification. A review of the claims of the '157 Patent reveals that numerous limitations from claims 50-61 are not taught or suggested thereby, including, a reflection hologram having a grating vector wherein the grating vector is not perpendicular to the front surface of the grating and further wherein in a first state where no electric field is applied to the grating via a switching means, a symmetry axis of the liquid crystal is

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oriented along the grating vector and in a second state where an electric field is applied to the grating via a switching means, the symmetry axis of the liquid crystal is perpendicular to the front surface of the grating.

The Office's reference to and reliance on Figure 11b is misplaced as this Figure is a part of the disclosure and may not be used as prior art in this rejection. The undersigned respectfully submits that the Office has failed to establish a *prima facie* case of obviousness-type double patenting.

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CONCLUSION

In view of the amendments to the claims and the remarks stated above, the undersigned representative respectfully requests that the remaining claims be passed to issuance. A notice of allowance to this effect is earnestly solicited. Should the Office require further information and/or feel that contacting the undersigned will expedite prosecution, the Office is invited to do so at the number provided below.

Respectfully submitted,

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